ably increased by repeated acetylation of the virus. After treatment with NaOH at pH 11, the acetylated virus gave with the Folin reagent 97 per cent. of the color given by a control of untreated virus. In view of Herriott's findings that the chromogenic power of acetylated tyrosine derivatives can be recovered by treatment with alkali, whereas that of acetyl tryptophane can not, it seems probable that a portion of the tyrosine in the virus, but little or none of the tryptophane, was affected by the acetylation.

Tests for biological activity carried out on both *Nicotiana glutinosa* and *Phaseolus vulgaris* plants showed that the specific virus activity of preparations in which 70 per cent. or less of the amino groups were covered was the same as that of the untreated virus. Samples in which the amino groups were 75 to 83 per cent. acetylated showed 25 to 50 per cent. inactivation. A preparation in which the amino groups were covered to the extent of 70 per cent. and the tyrosine plus tryptophane groups to the extent of 20 per cent. was inoculated into a number of young Turkish tobacco plants. The disease produced in these plants was indistinguishable from that in a group of control plants. After a period of 4 to 5 weeks, the viruses were isolated by differential centrifugation. The yields were comparable in the test and control plants. The virus obtained from the plants inoculated with the acetylated virus possessed the normal amino nitrogen content and showed the same chromogenic power towards the Folin reagent as did the virus from the plants infected with normal virus. Further evidence was thus obtained that infecting virus molecules may not necessarily function as exact patterns for reproduction. However, as in the case of the iodine oxidized virus, the objection might be raised that the plant cells had transformed the derivative into the normal form before reproduction occurred. In an effort to obtain a virus derivative less likely to be affected by the plant cells, samples of tobacco mosaic virus in 0.1 M phosphate buffer were treated with an excess of phenyl isocyanate at pH 8 and preparations of phenylureido virus were obtained. The amino groups were 43 to 63 per cent. covered, depending on the time of reaction. The virus derivative showed no significant change in specific virus activity and the disease produced in Turkish tobacco plants was indistinguishable from that caused by ordinary virus. The virus reisolated from the plants possessed the normal amino nitrogen content, in agreement with the results obtained with the acetylated virus.

In order to determine whether the treated preparations were chemically uniform or consisted of molecules altered to widely different degrees, tests were made with the ultracentrifuge and the Tiselius electrophoresis apparatus. The homogeneity of the preparations as determined in the ultracentrifuge was not measurably altered by the two types of chemical treatment. However, because of the nature of the chemical changes involved, a more sensitive test was provided by the electrophoretic mobility. The electrophoresis experiments were carried out at pH 7.3 in 0.1 ionic K_2HPO_4-KH_2PO_4-KCl buffer in which 80 per cent. of the ionic strength was provided by the KCl. The acetyl and phenylureido derivatives each possessed mobilities close to -9.3×10^{-5} cm.^{2}/volt sec. as compared with a mobility of -8.3×10^{-5} cm.^{2}/volt sec. for normal virus under the same conditions. It may be seen from the

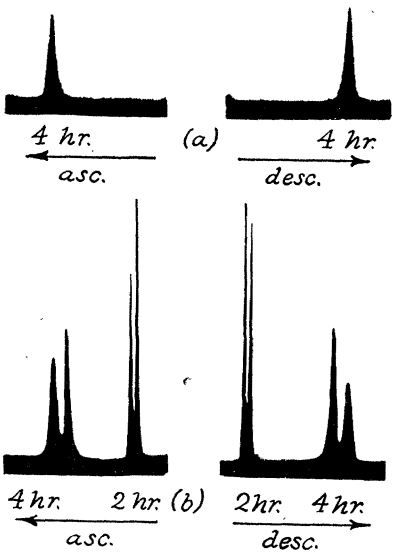

FIG. 1. (a) Acetyl virus. (b) Mixture of normal virus and phenylureido virus.

electrophoresis diagrams presented in Fig. 1 that the derivatives were very homogeneous with respect to electrophoretic mobility and that no detectable amount of the altered proteins migrated with the boundary representing the unchanged virus. In runs made with mixtures prepared with each of the virus derivatives and untreated virus, it was shown that the latter could be separated readily from the derivatives. The results as a whole indicate that the propagation of normal virus did not arise from unchanged virus present in the preparations of the derivatives and demonstrate that a large portion of certain functional groups of the virus molecule may be altered without interfering with the basic reaction of virus reproduction.

GAIL L. MILLER
W. M. STANLEY
THE ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH,
PRINCETON, N. J.

LEUCOCYTE LEVEL AND LONGEVITY IN RATS

PRELIMINARY to a study of the effects of various carcinogenic agents and the growth of induced and

transplanted tumors on the morphology of the blood of rats, a study was made of the variability in the morphology of the blood of normal rats of several closely inbred strains. Among these findings was one of general interest and practical value, especially if it proves to be applicable to man.

It was found that each strain of rats had a characteristic peripheral blood picture. The total leucocyte counts varied from 14.0± .10 to 25.1 ± .51 thousand per cu. mm. Fischer Line 344 rats had the lowest average white cell count and Line 2331 Copenhagen rats had the highest count. The total number of leucocytes and the percentage of neutrophile polys were characteristically highest in the latter and lowest in the former. These data are recorded in Table I and

TABLE I

THE MEAN LEUCOCYTE COUNT AND PERCENTAGE OF NEUTROPHILE POLYS AND THE AVERAGE LIFE SPAN OF SEVERAL STRAINS OF INBRED RATS

Strain	No. of rats	Mean W.B.C. in thousand per cu mm	Per cent. polys	Mean life span days/30
Copenhagen ...	174	25.1 ± .51	38	19.83 ± .13
A × C	228	17.5 ± .33	34	21.67 ± .13*
August	120	14.6 ± .38	31	14.03 ± .04
Marshall	250	17.1 ± .24	26	13.53 ± .09
Zimmerman ...	287	15.5 ± .23	26	11.86 ± .17
Fischer	719	14.0 ± .10	24	9.37 ± .14

* Based on rats of the first 7 B × S generations and would presumably be somewhat lower for the rats tested which had been inbred another 8 to 10 generations.

represented graphically in Fig. 1. In the final column of the table is recorded the mean life span values in

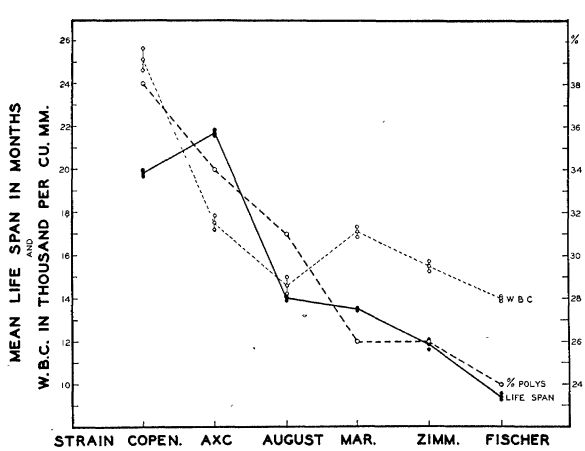

FIG. 1. Shows the relation of the mean total leucocyte count and percentage of neutrophile polys to the average life span in six inbred strains of rats.

months which had been previously determined for rats of these strains.

A parallelism in the observed total number of leucocytes and the relative percentage values of neutrophile polys and the expected average life span is strikingly apparent. Further the females were found to have a significantly higher leucocyte count than the males (the difference being 0.82 ± .16 thousand per cu. mm) and females of most of these strains were previously shown[1] to have significantly longer average life spans than males. This suggests that the association of a relatively high total number of neutrophile polys and a long average life span is probably not accidental.

CARL REICH
LENOX HILL HOSPITAL
W. F. DUNNING
COLUMBIA UNIVERSITY

ON THE SIZE OF THE LITTER AND THE GESTATION PERIOD OF PROCAVIA CAPENSIS

AN article has just come to hand by G. B. Wislocki and O. P. van der Westhuysen on "The Placentation of *Procavia capensis* with a Discussion of the Placental Affinities of the Hyracoidea" (Contributions to Embryology, No. 171, August, 1940). In this article the authors mention that of their eleven specimens of *Procavia capensis* two had six embryos, one four and the others three, two and one embryo. Therefore they regard it as highly probable that *Procavia capensis* carries from one to six embryos. This impression, caused by lack of adequate material, is evidently wrong. As so little is known about the breeding of this animal it may be worth while to give here the data provided by my more abundant material.

The sheep farmers of the Karroo in South Africa have practically exterminated the carnivorous mammals and the large birds of prey that could do harm to their flocks. The result is that the dassie, the natural prey of these predatory animals, has multiplied to such an extent that once I read a short note in a newspaper headed "Dassies like rabbits." That put me on the track and I came in contact with a native professional dassie hunter. The dassies have become so numerous that they are serious food competitors to the sheep and the farmers paid the native a small premium for each dassie. In this way I have collected uteri of *Procavia capensis* over a number of years and have accumulated well over 400 specimens in all stages of development.

The two uteri with six embryos of Wislocki and van der Westhuysen must be very rare exceptions indeed. I have never seen more than four embryos. Most of my material was shared with Professor Nils Holmgren of Stockholm, and in these instances the bicornuate uteri were cut into halves. In my series of entire uteri there are 10 with one embryo, 59 with two, 35 with three and 10 with four embryos. Of the divided, half uteri 179 have one embryo and 62 have two. So we can safely conclude that *Procavia capensis* normally

[1] M. R. Curtis, W. F. Dunning and F. D. Bullock, *Am. Jour. Cancer*, 17: 894, 1933.